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Proceedings of Conferences and Symposia (cont'd)

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Corn, M.: Role of High Risk Groups in Standard Derivation. In Proceedings of the Conference on Pollutants and High Risk Groups. University of Massachusetts, Amherst. June 5-7, 1978. Published in Env. Hlth. Persp. 29:162-166, 1979.

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Corn, M.: Regulating Toxic Substances: An Update. In Public Policy, Science, and Environmental Risk. Panem, S., Ed. The Brookings Institution, Washington, D.C., 1983, pp. 29-32.

Corn, M.: The System in the United States. Health and Safety in the Chemical Laboratory. Royal Soc. Chemistry Spec. Pub. No. 51., London, 1984. pp. 71-91.

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Corn, M.: "Reflections of Progress with Mine Dust Control Technology. Theme Paper IV, VII International Pneumoconiosis Conference, Pittsburgh, PA. August 23-26, 1988.

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Corn, M.: "Risk Awareness: Approaches to Selecting Employee Risks for Reduction". Proceedings of the 12th NIH Research Safety Symposium on Managing Hazardous Materials in Biomedical Research Facilities. March 22-23, 1990, Washington, DC, NIH Publication No. 91-3200, Dept. HHS, PHS, NIH, pp. 33-37 (1991).

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Corn, M.: "Current Status and Future Prospects for Prevention and Control of

Air Pollution at the Workplace. Proceedings of the 8th International Conference on Occupational Lung Disease. September 14-17, 1992, Prague, Czechoslovakia, International Labor Organization, pp. 77-112 (1993).

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Corn, M.: "Integrating Biomarkers Into Health and Safety Programs". Proceedings of Department of Energy Workshop on Biomarkers, Santa Fe, NM, April 27-29, 1994. In Biomarkers and Occupational Health: Progress and Perspectives. J. Henry Press, Washington, DC 1995. pp. 140-147.

Corn, M.: "New Solutions to Occupational Hygiene Concerns ". Proceedings of 15th Annual Conference of Australian Institute of Occupational Hygienists, Perth, Australia, December 1-4, 1996. pp. 1-21.

Abstracts - Not recorded.

Book Reviews - Numerous, but never recorded.

Reports of Sponsored Research

Silverman, L., M. Corn and F. Stein: Respiratory Protective Equipment, Progress Report, Harvard University, USAEC Contract AT (30-1) 2355, June 1960.

Corn, M. and F. Stein: Adhesion and Re-Entrainment of Solid Particles, AP 00191-01. Semi-final report covering the period June 1, 1962 through December 31, 1963.

Corn, M. and R. Quinlan: Light Transmission and Scattering Properties of Particles, AP 00302-02. Terminal report covering the period November 1, 1963 through December 31, 1965.

Corn, M., F. Stein and N.A. Esmen: The Shape of Atmospheric Particles, AP 00431-01. Progress report covering the period June 1, 1965 through March 30, 1966.

Corn, M., N. Kotsko, D. Stanton, W. Bell and A. Thomas: Pathophysiologic Response to Single and Multiple Air Pollutants in Humans and Animals, PH 86-67-73. Final Report covering the period January 16, 1968 through May 31, 1970.

Corn, M., F. Stein, W. Bell, Y. Hammad and S. Mauckshaw: Physical and Chemical Properties of Respirable Coal Mine Dust, USBM Grant No. G 010 1742. Final report covering the period June 1, 1970 through July 31, 1972.

Corn, M., N. Kotsko and D. Stanton: Absorption of Pollutants in the Cat Respiratory Tract, NIEHS Grant ES AP 00501-01. Final report covering the period March 1, 1970 through December 31, 1973.

Corn, M., D. Weyel: Development of Tantalum Dust Delivery System for Bronchography, NCI No. 1-CB-23229. Final Report covering the period March 1, 1971 through February 28, 1973.

Corn, M. and N.A. Esmen: Concentrations of Airborne Fibers in Manufacturing Facilities. Series of Sixteen Reports, Thermal Insulation Manufacturers Association, 1973-77.

Corn, M., et al: Design of Study to Determine Effects on Health of Hazardous Waste Site, Tennessee Health Department, October 1981.

Corn, M., et al: Critical Review of the Literature: Selected Topics Related to Health Hazard Associated with Inhalation of Dust Containing Free Silica with Comment Applicable to MSHA Quartz in Respirable Dust Program. Final Report to American Mining Congress and Bituminous Coal Operator's Association, June 30, 1983

Reports of Sponsored Research (cont'd)

Corn, M. and Breysse, P.N.: Review of Working List of Issues to be Addressed in a Finding of Completeness. Final Report Presented to Maryland State Hazardous Waste Siting Board, Annapolis, MD, September, 1983.

Corn, M. and Burgoa, Carlos Santos: Critical Review of the Literature: Selected Topics Related to Coal Workers Pneumoconiosis and Free Silica Content of Coal Mine Dust. Final Report to the American Mining Congress. January 24, 1985.

Corn, M.: Asbestos Control Management Document. U.S. Library of Congress. Washington, D.C., August 1985.

Corn, M., Zeger, S., Hall, T.A., and Lau, C.C.: Final Report. Factors Affecting Free Silica Content of Mine Dust. Submitted to American Mining Congress. September, 1987.

Corn, M., Lees, P.S.J. and Breysse, P.N.: Final Report. Characterization of End-User Exposure to Residential Insulation Products. Submitted to Medical and Scientific Committee, Thermal Insulation Manufacturers' Association Stamford, CT. February 10, 1992.

Corn, M., Lees, P.S.J. and Breysse, P.N.: Final Report. Characterization of End-User Exposures to Industrial (RCF) Insulation Products. Submitted to Medical and Scientific Committee, Thermal Insulation Manufacturers' Association. Stamford, CT. March 27, 1992.

Corn, M. and Cohen, R.: Final Report. The Johns Hopkins University Retrospective and Prospective Studies of Reproductive Health Among IBM Employees in Semiconductor Manufacturing. Submitted to International Business Machines Corporation. May, 1993.

Other

Corn, M. (Interview): Noise is a Prime Target at OSHA, Occ. Hlth. and Safety pp. 12-18, July/ August 1976.

Report to the Secretary of Labor on Status of OSHA as of January 20, 1977 (submitted upon resignation as Assistant Secretary of Labor for Occupational Safety and Health) published in BNA Reporter, January 1977.

Corn, M. (Interview): "Dr. Morton Corn on OSHA", Chem. Time & Trends, p. 11, 1977.

Corn, M.: Report of the Health Effects Research Review Group. U.S. Environmental Protection Agency, Science Advisory Board, 1979.

Corn, M. (Book Review): Regulating Sweden, Regulating America. The New Leader, July 27, 1981.

Corn, M. (Book Review): Who's Poisoning America, Nader, R., et al. In Chemical and Engineering News, N.Y., May 3, 1982. Sierra Club Books, San Francisco, CA, 1982.

CURRICULUM VITAE

Morton Corn

Part II

TEACHING

Advisees

Advised more than 250 M.S. students; 18 Doctoral graduates; and several Postdoctoral Trainees.

Departmental Oral Participant - Not recorded.

Preliminary Oral Participant - Not recorded.

Final Oral Participant - Not recorded.

CLASSROOM INSTRUCTION

Primary Instructor

University of Pittsburgh

Introduction to Occupational Health
Industrial Hygiene
Aerosol Technology
Industrial Ventilation
Air Resources Management
Air Pollution Laboratory
Air Pollution Field Studies
Introduction to Biomedical Engineering (introduced as a first offering in this field in the School of Engineering, University of Pittsburgh).

The Johns Hopkins University School of Hygiene and Public Health

Principles of Occupational Safety
Management of Occupational Safety and Health Programs
Environmental Risks and their Control
Seminar in Environmental Health Engineering
Environmental Health (Associate Course Director 1985-89; Director 1990-1995)

Principles of Industrial Hygiene

Lectures in Other Courses - Extensive, but not recorded

CLASSROOM INSTRUCTION

Continuing Education

Course Director or Co-Director

Industrial Hygiene Engineering (5 days, February 1981)
Management of Occupational Safety and Health Programs (3 days, February 1982;
3 days, April 1984)
Fundamentals of Industrial Hygiene (3 days, April 1982)
Fundamentals of Industrial Hygiene (3 days, October 1982)
Fundamentals of Industrial Hygiene (3 days, March 1983) Asbestos (1 day, April 1984)
Introduction to Industrial Hygiene (1 day, November 1984)
Asbestos in Non-Occupational Environments (1 1/2 days, April 1985; March 1986)
Hazardous Wastes (3 days, July 1985)
Industrial Hygiene for Safety Professionals (3 days, October, 1988; 3 days, October, 1989)
Introduction to Risk Analysis and Risk Management, 1989
Risk Assessment: Principles and Case Studies, (This is also an academic credit course). Offered 1990-1994.

Participant

Preventive Medicine, April, 1981
Toxicology, April, 1981; May, 1982; April, 1996
Prevention and Surveillance in Industry, 1981-83
Preventive Medicine, April, 1982; April, 1983
Toxicology Update; April, 1987; April, 1988; April, 1989
Biohazards; July, 1987; July, 1988; July, 1989, 1990; February and August, 1991; July, 1992-99
Environmental Auditing; 1995

RESEARCH GRANT PARTICIPATION - Numerous, never recorded.

ACADEMIC SERVICE

School Committees

Department of Environmental Health Sciences,

University of Pittsburgh Graduate School of Public Health. Served on the following:

Member, Executive Committee
Member, Safety Committee
Member, Appointments and Promotions Committee
Member, Faculty Benefits and Welfare Committee

ACADEMIC SERVICE

School Committees (cont'd)

Johns Hopkins School of Hygiene and Public Health

Member, Curriculum Committee, 1981, 1982
Chairman, Review and Search Committees for Chairman, Department of Health Services Administration, 1981-82
Member, Ad Hoc Committee on Appointments and Promotions, 1982
Member, Committee on Appointments and Promotions, 1982-87
Member, Chemical Toxicology Safety Committee, 1984-90
President elect, Faculty Senate, 1988-89; President, 1989-90; Past President, 1990-

91

Member, Committee of the Whole, 1988-91
Member, Advisory Board, 1988-91
Member, Search Committee for Dean, 1989-90
Chair, Long Range Strategic Planning, Subcommittee on Professional Practice,

1992

Member, MPH Academic Committee, 1993-94; 1994-95, 1995-96

University Committees

Advisory Committee, Materials Research Center, Johns Hopkins University,
1981-85

Member, Advisory Committee, Johns Hopkins University Energy Research Institute,
1982-85

Chairman, Johns Hopkins University Safety Advisory Committee, 1985-90

Member, Committee of the Whole, 1988-91

Member, Advisory Board, 1988-91

Member, Search Committee for President, 1989

PRESENTATIONS

Scientific Meetings

Never recorded - numbers in excess of 100

Invited Presentations/Seminars

Never recorded in total - numbers in excess of 100

Updated July 9, 2002

**Notes On Inspection Of Four Spokane, Washington Homes
Which Contain Vermiculite Attic Insulation**

By Morton Corn, Ph.D.

August 10, 2000

9909 East Garland Avenue

It is 8:45 a.m. I am at 9909 East Garland Avenue to inspect the King home for vermiculite attic insulation. With me are attorney Rocco Treppiedi, counsel from Perkins Coie, representing W.R. Grace; Joseph D. Wendlick, consultant to W.R. Grace; Michael Black, attorney for the plaintiffs; Jacques Nuijten, photographer retained by W.R. Grace; and Don Hurst of Fulcrum Environmental Consulting Inc., consultant to plaintiffs.

The purpose of this inspection is to assess the home and the attic for the potential for exposure to dust from the attic insulation. It is alleged by plaintiff that the insulation contains asbestiform fibers in the vermiculite insulation, and that there is potential for significant exposure that could contribute to health problems of house occupants. I will observe the attics, the insulation and the homes to opine on the potential frequency and severity of exposure in these facilities.

The entrance to this house is from a covered porch facing south. The house is in the midst of renovation. One enters through the living room. One can walk straight back from the entrance to the rear of the house. I'd estimate that distance at about 30 ft. Ceiling height is approximately 7½ ft. There is new sheet rock on all of the ceilings. The width of the house is about 40 ft. As one enters the front door, the remodeling below the sheet rock ceiling is in progress, with vertical studs physically separating the living room from a bedroom to the left. There is a bathroom also off that left-hand turn. Straight ahead is the west side of the building. The bedroom is in the southwest corner of the house.

A second is in the northwest corner of the house and appears to be a storage room, but could be used as another bedroom. A kitchen is on the north side of the house with a small dining area adjoining the bedroom. There is no wall between the dining room, kitchen and bedroom. The northeast corner of the house contains the heating system. It is a gas fired furnace; the water heater is also gas fired. The plaster ceiling still exists in the store room. The area used as the master bedroom now is in the southeast corner of the house. Between it and the storage area there has been created by the use of vertical studs another small storage area. The owner shared with

us that a brick wall was installed with a wood heater stove in the living room, and that the area separating the living room and the master bedroom was a cinder block wall which was taken down.

The attic access is in the space adjoining the master bedroom and the northeast storage area. The access is approximately 1 ft. wide by 30 inches long. There appears to be three types of insulation in the attic. I can see fiberglass batts, a blown-in non-vermiculite insulation and a vermiculite type insulation. The depth of insulation in this attic space is at least 18 inches. In some places it looks to be several feet. From peak to floor the attic is approximately six feet. The attic slopes to all four directions. There are attic vents on the north and the west sides. The wood stove vents through the attic to the roof with an approximately 1 ft. in diameter galvanized steel chimney. The rafters and wood plank on the roof of the attic are visible. There is no need to enter this attic for maintenance of any utilities. There are grill cut-outs for ventilation ducts in the sheet-rock ceiling that have been affixed to the underlying plaster ceiling. The plaster ceiling still remains in the northeast corner room of the home and in parts of the room where the attic access exists. Ventilation ducts are under attic insulation.

It appears there is no direct air route between the living parts of the house below the attic and the attic with the exceptions of the attic access panel and the wood stove chimney. That connection would be internal to the chimney. The chimney is fixed by two flanges to the ceiling and there is no air communication from the living room to the attic. There are two roof vents to the roof from the attic on each of the sides: east, west and south. There are four roof vents on the north side. Thus, there is opportunity for re-circulation of air through the attic to dilute any air that may have received some fiber releases from access to the attic. In the quiescent state with no access to the attic, there is no mechanism for fiber to be made airborne in the attic. With respect to debris on the floor of the house, I see no clearly identifiable debris that I recognize as attic insulation. It should be noted that the house is built on a concrete slab. There is no basement or crawl space.

After Jacques Nuijten photographed the attic and had to insert his upper body into the access port, I noted there was some cellulose insulation that dropped to the floor and on tops of some surfaces. I used wet towels to clean those surfaces. I picked up all the visible pieces of cellulose insulation and placed them in paper towels which I took with me. Thus, the surfaces immediately below were wet-wiped and visible debris was removed. At future installations, we will vacuum and utilize a plastic cover since these access ports are small and the fallout of insulation, even non-asbestos insulation, may concern residents.

On closer inspection of the attic insulation, it appears that there is a gray cellulosic insulation closest to the top of the ceiling paneling. There then appears to be fibrous glass batts (on top of the access, there's at least ten inches of fibrous glass batting). There's then the blown-in white cellulose, the material that fell to the floor and I picked up when cleaning up. Finally, there is some vermiculite insulation. The vast majority of the material appears to be non-vermiculite. The bulk analysis samples collected by Hunter Environmental should lend some quantitation to these qualitative observations.

Because of the above layering of the insulation, any cracks adjoining the 2 by 4s below the ceiling and which would permit thin crack lines of air connection to the attic insulation, would be in contact with a layer of gray cellulosic insulation.

It is 10:30 a.m. and we are winding down this inspection. In summary, I find the opportunity for exposure to airborne fibers from vermiculite attic insulation to be absolutely minimal and possible only at the time that someone would access the attic. The reasons for this conclusion are 1) the limited access to the material, virtually only the attic itself during time of renovation; 2) the low asbestiform fiber content of the material; and 3) the ventilation to the attic which would dilute any airborne particle concentration. Finally, the vast majority of the attic insulation does not appear to be fibrous vermiculite insulation.

During the additional inspections today, Debbie Yates from the Perkins Coie office will replace Rocco Treppiedi.

1301 West Mallon Avenue

It is noon. I am at this house to perform the same type of inspection that was performed in the first house. This is a smaller house, approximately 30 ft. by 30 ft. on a corner lot. The tenant is home and I am awaiting the arrival of a rented HEPA vacuum and plastic which I decided to utilize after some of the non-asbestos insulation from the first house attic fell to the floor during our examination of the attic space. I picked that material up, retained it and will confirm its content by sending it to the R.J. Lee Lab. I also used wet towels to wipe the ladder, the floor and horizontal surfaces and book-ends in the vicinity of the attic access.

The exterior of this house is not in very good condition. As far as the roof, there is repair work needed on the edge of the roof by the shingles and the wood below the roof needs paint. There are three roof vents on the sloping roof. The roof slopes to the south and the north and those vents are on the south side. There is a

small sloping section on the east and west sides. The siding to the house is painted aluminum. There is a roof entrance cover over the entry door.

A HEPA vacuum has been rented from a local vendor and we have purchased plastic covers to cover the floor and the adjoining furniture. However, in opening this attic access, which is about 2 ft. by 2 ft., there is not as much material in the vicinity of the access cover and I did not see any material that fell to the floor. The above ceiling attic is about 5 ft. from ceiling to peak. The rafters are visible as are the nails coming through from the roof. There is nothing stored up here. The insulation depth is 1 to 2 feet. It is mixed insulation. I can see some vermiculite attic insulation on top of fibrous glass insulation.

I am going to dictate my impressions of below the ceiling space as I enter the door. Entering the front door, one enters the living room. There is a fireplace on the east wall of the building (living room). There is a plaster ceiling. The ceiling is approximately 8 ft. high. Directly in front of me on the opposite side of the living room and opposite the front door, one enters the dining room. The dining room has a glued-on panel ceiling. The dining room area is approximately 10 ft. by 10 ft. At the left of the dining room area is the bathroom. The bathroom also has a plaster ceiling. All of the ceilings are intact with no air connection to the attic. The kitchen is to the right of the dining room area, southwest corner of the house, and there is a door to enter the backyard as well as a door to the basement area. The kitchen area has the same type tile glued to the ceiling. I have not observed holes in the ceiling that could connect to the attic. The bedroom is off of the dining room. One enters it from the north side of the dining room. It is the northwest side of the house. It has a plaster ceiling. There are no holes in the ceiling. The ceiling is in its integrity. There is no air connection to the attic. The bedroom is approximately 12 ft. by 12 ft. The basement houses the water heater and a washer and dryer as well as a side-by-side sink for washing. There is no air connection from the basement to the attic. There are three stand pipes going up to the roof from the basement.

The heating system for this house is electric. There are individual electric heaters in several of the rooms. There is no furnace and no ducted heated air system. The bathroom has an electric heater, as does the dining room. The living room has a baseboard electric heater under the picture window and there's also a fireplace in the living room.

This house has not undergone any renovation. Thus, there has not been exposure to attic insulation from work in the attic in association with renovation.

On re-observing the attic space I believe there are three distinct types of insulation: fibrous glass, cellulose, and vermiculite insulation, the latter mostly sprinkled on top of the other two types.

In summary, there is even less opportunity for brief exposure to attic insulation in this house than in the former house. There is no renovation that has been performed in the past or is planned. During renovation, depending on the work involved, there could be some short-term exposure to attic insulation. There is integrity of all ceilings observed and no connection from the attic to the living space via an air channel. There are vents in the attic should anyone have to go up there. They would help to clear and dilute any fiber that is made airborne. Therefore, I believe there is no significant health risk associated with the presence of any vermiculite attic insulation in this house. This will end the inspection of this house. It is 1:45 p.m.

1512 West 14th Street

It is 2:55 p.m. This is the third house we will inspect today. This is a two-story house as contrasted to the first two houses inspected.

The attic access is located off the southeast bedroom. It is in a clothing closet. I removed the access door and have a full view of the full attic. There has been no renovation I can see. The vermiculite insulation is present to the tops of the floor joists. There are rolls of fibrous glass stored in the attic. The ceiling of the bedroom is a trowled-on plaster. There is no air route to the attic through this bedroom. This house is heated with a ducted gas heating system. Both supply and return are ducted. The furnace is in the basement. It has affixed to it both a humidifier and a Honeywell electronic cleaner. The latter is noteworthy in that it would remove any dust particles, pollen, etc. in the air with a 99+ efficiency. The ceiling height is approximately 8 ft. The southwest room on the second floor is utilized as an office. It has the same trowled-on decorative plastic ceiling. There are no holes or cut-aways in the ceiling to the attic. There is a closet off of this room but no access door to the attic. A hall linen closet between the two bedrooms does not have an access door to the attic. The northeast bedroom is under renovation. The plaster ceiling has been removed and in doing it has opened up some small holes through which I can see the bottom of some attic insulation. These holes are from one-half inch diameter to a quarter inch diameter in size. The wallpaper has also been removed, as has whatever covered the floor. The northwest room is a bathroom. It has a new ceiling. It is drywall. There is a closet off the bathroom. It does not have an access to the ceiling. On the north side between the two bedrooms is a connecting room to a sun porch. The supports of the sun porch have apparently been removed. I will not step out on it, but both the porch

and the connecting room have a paneled ceiling and there is no access to the attic. On the lower floor one enters a little entry way and then the living room. One passes through the dining room to a kitchen area that is being remodeled. The ceiling has been opened. One can see the joists in the floor above. It is clear there was no insulation between these floors. There was apparently wood paneling on the ceiling. There is some of that left in place. The only connection to the attic from the basement are the risers and one can see them in the walls of the kitchen going vertically upward.

In summary, there is an unused attic in this building with vermiculite attic insulation on the floor of the attic up to the top of the attic joists, which would be about 4 inches. There are stored rolls of fibrous glass insulation up there, but otherwise no sign of former renovation work or any remodeling. The second floor immediately below the attic does not have any air pathway to the attic with the exception of some small holes in one bedroom where the ceiling has been removed, leaving one quarter inch to one half inch holes in the ceiling. This would be to the lower surface of the attic insulation. The first floor of the house has no air connection with the attic. There are risers from the basement up through the attic to the outdoor air. These are black iron pipe of approximately 4 inch diameter. There are heat vents in the attic and risers for the air. A chimney extends vertically upwards through the house and out the roof. There is no air connection from the first floor to the attic and there is no air connection from the basement to the attic. The furnace is a supply and return ducted system with a Honeywell electrostatic precipitator in the supply air exiting from the furnace. These precipitators are rated at 99+% efficiency for 10 micron particles. Thus any particles in the air of this house would be pretty thoroughly cleaned.

If one assumes that there is asbestiform materials in the vermiculite attic insulation to the extent of less than 1% by weight, I find insignificant probability that exposure would occur to anyone in this building, except during some remodeling where there might be some short-term small elevation of the air in the immediate breathing zone of the individual. I do not think such intermittent exposure has any health significance. It is 4:20 p.m. and we will be leaving these premises shortly. This will be the end of the inspections today. We will now go to see a bag of Zonolite insulation that was apparently still available that was used in the last house inspected. It is 5:05 p.m.

We have driven to a location called ABC Storage near the airport where there is a bag of insulation that was utilized in the second home I inspected at 1301 West Mallon Avenue. I have asked to look at those bags to identify the insulation used. There is one bag that has not been opened in a black plastic bag. I've removed the Zonolite bag and asked that it be photographed on each side. There is no date on the

bag. The first storage bag had empty torn bags which had been used to hold the insulation, but there was now no insulation in those bags.

2207 South Adams Road

It is 7:50 a.m. I am at this home in the Spokane Valley to perform the same type of inspections performed yesterday. Those in attendance are the same as yesterday. This is a three-story Cape Cod appearance home. The third floor is a full walk-in attic. The roof slopes from the apex to east and west. At the apex it's about 7½ ft. high. The floor of the attic is wood and is open at the edges of the sloping roof where one can see the attic vermiculite insulation that is beneath the floorboards of the roof. The attic has carpets on the floorboards and may cover perhaps 60% of the floorboards. There are windows in the north and south sides of the attic. There is access to the edges of the attic (east and west) at floorboard level; that access is perhaps 1 ft. width on each side. There is no need to approach the material or to intrude upon it in the process of the storage that is up here, as the photographs will show. There is some insulation adjacent to one window on the north wall. It is batts of fibrous glass. Otherwise . . . the space between them is bare. In looking at the roof shingles while walking at attic level, there are numerous places where light is visible through the shingles. On closer inspection there is a pathway through the roof shingles which would cause leakage. This caused me to look at the floorboards where there is visible water staining of the floorboards. Thus I conclude there is some leakage from this roof.

Access to the attic is via an in-place staircase. I'm now going to look at the second floor rooms and their ceilings. The bedroom in the northwest corner has a plaster ceiling with hanging lights affixed to hooks in the ceiling. There is no other breakage of the ceiling. It is in good condition. The southwest bedroom has a similar plaster ceiling. It is a trowled-on plaster with three light fixtures hanging from hooks in the ceiling. There is no other breakage of the ceiling. The heat in the home is via a hot water heating system. Thus there are no air vents and no air communication with the unfinished attic. The southeast bedroom has a similar plaster ceiling. There are three lights hanging from hooks in the ceiling. There are no other holes in the ceiling for air to communicate with the space beneath the attic floorboards. There is a bathroom on the west side between the two bedrooms. This has a painted plaster ceiling with two lights hanging from hooks over the sink. There is no other breakage in the ceiling. Opposite the bathroom and on the east side there is a small bedroom with one light hanging from a hook on the ceiling. There is no other puncture or breakage in the ceiling. The ceilings are all in very good shape. They are all plaster. The hot water or steam radiators are prominent in these rooms beneath the windows or adjacent to a wall. The northeast bedroom, which appears to be the master bedroom,

has three lights hanging from hooks on the ceiling, which is a plaster material painted over. It is in excellent condition. There are no other punctures in the ceiling which would communicate with beneath the floorboard area of the attic. At the edges of these rooms, which is beneath the exposed insulation in the attic, i.e., that which does not have floorboards over it, there is no air communication with the edges of the east and west bedroom or bathroom ceilings. Thus there is no ceiling air route between the insulation to the second floor rooms. I also checked the closets in rooms on the second floor and they have ceilings in their integrity. There is no air communication between the closets and the third floor. During my walking the second and the third floors, I have looked for any sign of insulation debris on the stairs or the second floor. I saw none that is clearly identifiable as vermiculite insulation.

I am now on the lower or ground floor of the house. On the south side there is a living room with a fireplace. The ceiling is a popcorn type sprayed-on ceiling. It has been painted. It is in excellent condition with two small chandelier-type candle lights hanging from the ceiling. There is a door on the south side to the outdoors. There are radiators against the wall on the east and west and a window on the east and west and one on the south. The foyer has the same type ceiling with one hanging light fixture. It is in excellent condition. To the right of the entry on the north side is the dining room with the same type ceiling with one chandelier affixed to the ceiling and one hook in the east corner of the room. A plant can be suspended from this hook. The kitchen is in the northwest corner of the house. It has a painted plaster ceiling in its integrity and there is a small dining area to the north of the kitchen. There are two light fixtures affixed to the ceiling in the kitchen and one to the small dining area adjoining the kitchen. They are in excellent condition and in their complete integrity; no cracks, no punctures. There is a rear door between the kitchen and the living room on the west side of the house and a bathroom adjacent to this rear door. The bathroom has a plaster painted ceiling in its integrity, as does the hallway that leads from the entry foyer to the rear door. The same is true of a storage closet adjacent to the bathroom. Each of these small rooms has a light fixture affixed to the ceiling; the bathroom has two. Access to the basement is adjacent to the storage closet and is entered from the hallway between the entry foyer and the rear door of the house. Going down the basement stairs, I enter a finished basement. The ceiling is a glued-on fiberboard panel ceiling. The basement has a pool table in place and a ping pong table. There are refrigerators for storage. The furnace is also located in the basement. It adjoins the south wall chimney for its exhaust. There is a laundry room in the basement containing a washing machine, sink and water heater. And there is a shower stall in the basement. This area is in excellent condition, as is the entire house.

In summary, the allegation of health concern for the presence of the vermiculite attic insulation is associated with an absolutely insignificant probability of significant exposure of occupants of the house or of persons doing work in the house. The house is in excellent condition. Remodeling of the attic would not involve any change of floorboards and the running of wires would be a minimal one time exposure which could easily be protected against. And if not protected against, it would not be significant exposure to the respiratory tracts of those who received it. There is no pathway for airborne asbestos or vermiculite attic insulation to connect with the second floor, first floor or basement rooms. There is no occasion to track the material because of the floorboard covering of the attic and the lack of any need to even approach the approximately exposed 1 foot of insulation on east and west sides of the floorboards. Therefore my opinion is that a potential risk to health from any asbestos airborne fibers from the attic insulation is insignificant. It is 8:40 a.m. This will end the inspection of this house.

**Notes of Inspections of Houses with Vermiculite
Attic Insulation, Spokane, Washington**

By Morton Corn, Ph.D.

August 16, 2000

With me on the inspections are Jacques Nuijten, photographer retained by Perkins Coie; Joe Wendlick, consultant for W.R. Grace; Michael Black, attorney for plaintiff; Rocco Treppiedi, local attorney with Perkins Coie representing W.R. Grace and Don Hurst, Fulcrum Engineering consultant to the plaintiff.

418 East Wellesley Avenue

It is 9:05 a.m. We are at 418 East Wellesley Avenue to inspect for vermiculite attic insulation. Marco Barbanti, the plaintiff, was at the house when we arrived and unlocked it just prior to the arrival of Michael Black. Mr. Barbanti, who I met, has now left the premises.

This is a small one-story home with a peaked roof. The main roof slope is from East to West. There is a small entry overhang over the rear door entry and a sloped dormer type roof on the north side with a small entry overhang over the front door. I placed a plastic sheet below the attic entry, which is in a closet in the south side of the northwest room of the building. The building has two rooms, one to the left and one to the right of the entry. At the rear of the right-hand room is a closet with the attic entry which is approximately twenty-four by eighteen inches in width. I am almost directly below the attic peak which arises to a height of approximately ten feet at the center and slopes to the two sides. The attic is unfinished. I see the floor joists which run from north to south. There is insulation laid in between the floor joists. It appears to be mostly mineral wool; some of it appears to be vermiculite. The vermiculite is about three inches in thickness as judged from its height on the 2 by 6 inch floor joists. There is a vent approximately 3 ft. by 1 ft. on the north face of the attic and there is a stand pipe from the basement also rising through the attic. There is no wood flooring on the joists of the attic. In the northeast sector of the attic there is some batting laid between the joists. I see the paper backing of the batting but will not attempt to walk on the attic joists. It does not appear that anybody has been up here for a long time. My flashlight indicates no dust in its beam. That is I see no Tyndall beam effect. It seems very quiescent.

I will now describe the layout of the home as I enter the front door. The exterior of the house is horizontal simulated wood aluminum siding. It is dirty and in need of a good power wash. On the roof overhang above the entrance, which is about a foot in depth, there are heat risers. There are also heat risers beneath the overhangs of the roof on the south, east and west sides. The siding I described in the front extends around the entire house. The yard of the house is in very poor condition. It is overgrown and there is dried up grass on the lawn. The windows need a coat of paint, as do the storm windows (wood) where they are in the window frames.

As noted earlier, when one enters the house you are in the midst of the living room with fireplace directly in front. There is a lot of material stored in the house. The living room does not have any furniture, but only boxes, videos, papers, a card table piled with papers, etc. In addition to the fireplace, there is a heat vent at floor level in this room. The room on the right is the room with the attic entry that I described. There is a heating vent on the south wall of this room. On the southwest corner of this room there is a door entering to the bathroom. The ceilings in all rooms are plaster with a heavy coat of paint. There are no holes or intrusions into the ceiling to connect with the attic. The bathroom also has a heat vent. Passing through the bathroom, one enters the southwest corner of the house where there is a return air vent on the floor and a heat supply vent on the southeast wall of the room. There is another closet on the northeast corner of this room. It is wood-paneled and there is no connection with the attic. The ceiling in this room is a painted over plaster ceiling in its integrity. There are light fixtures in the room at the center of the ceiling. The living room does not have any light fixtures or any other utility affixed to the ceiling. On the east wall of this room there is a door which permits entry to the kitchen. The kitchen also has a plaster ceiling. The ceiling of all these rooms is at approximately the 8 ft. height, perhaps 8½ ft. The ceiling of the kitchen has two minor plaster cracks. From the kitchen one enters the rear entry door to the yard. There is a heat riser on the west wall of the kitchen. On the east wall of the kitchen is an entry way to the fourth area of the house. It is a small perhaps 10 by 10 foot area that is connected by a large archway to the living room. It would be used as the dining area. It is piled with papers and stored materials on the floor. There is no furniture. The heat riser for this room is on the west wall of the room adjoining the entry to the kitchen.

A second door off the kitchen on the east wall and closest to the rear wall of the house is the entry to the basement. The basement has the base of the chimney with a clean-out door, a hot water heater and the gas furnace with the supply and return ducts. I have walked the periphery of the basement and there is no direct connection along the walls of the house to the attic. The first floor floorboards cover the entire basement. There is plaster above the stairs leading up from the basement and it is in

its integrity. Thus, there is no air connection from any place on the ceiling of the first floor or from the ceiling of the basement to the attic. There is another small store room with an entry door under the stairs leading up to the first floor. The ceiling of that room is in its integrity with no connection to the attic of the house. The basement area also has a work bench. There is all type of stored materials on the floor. A cat is apparently locked down here all day and is not in the best of physical condition, as judged from its coat.

In summary, this house has vermiculite attic insulation. It also has mineral wool insulation and it may have fibrous glass insulation, as evidenced by the paper tops of fibrous glass, of what I believe is fibrous glass batting. In my opinion, the attic has probably not been entered since building construction. There is no storage of household goods in the attic. The attic is ventilated and the insulation, for the most part, appears to be about 3 inches deep, although those sections that had the paper batting tops may be as much as 6 inches.

There is no air connection between the attic and the second floor ceilings. All those ceilings are intact. The entry to the attic is in a closet and precautions were taken during our inspection. There was no droppage of material from the attic. A plaster painters drop cloth was used.

The heating system, which is gas, uses a ducted supply but I believe the return is not ducted. The storage tank for the old oil furnace remains in the basement. There is no connection via air from the basement ceilings adjoining the walls to the attic. The flooring of the first floor is in its integrity to the walls.

In my opinion there is an absolutely minimal opportunity for exposure to attic insulation, be it asbestos, mineral wool or fibrous glass. There is virtually zero health risk from attic insulation to occupants of this building. In the case of renovation of the attic space, which I do not believe likely considering the condition of this house and the nature of adjoining housing in the neighborhood, precautions could be taken of an operations and maintenance nature that would protect individuals doing the renovations from inhalation of any attic insulation made airborne, if it is subsequently demonstrated that there is any significant asbestos in the air when this attic insulation is vigorously intruded upon. This will end my inspection of this property.

1803 West Knox Avenue

It is noon. I am at this house to inspect the house and the vermiculite attic insulation. First I will comment on the exterior of the house. There is a chain link fence around this corner property at Oak Avenue and Knox Avenue. It is a two-story

home. The second floor windows indicate that it is living space. The roof slopes north to south. There is a dormer almost the entire length of the sloping south roof on the second floor and on the first floor there is a dormer covering the entrance door to the house. The shingling is wood painted. There are storm windows on many of the windows. The exterior of the house is well-maintained, as contrasted to the last house. The chain link fence extends around the back yard of the house. There is a porch off the rear of the house and a projecting dormer on the first floor level with a sloping roof at the rear of the house. This extension of the house has a door to enter the garden and there is also a door to enter the rear of the house from the porch. The house has a basement. I can observe the basement windows as I walk the periphery of the exterior.

I will walk through the front door and describe the layout and condition of the house inside. Thus I enter the living room area, which is to my left. And on the far side of the living room there is an archway to the dining room. Directly ahead of me are the stairs to the second floor. To the right is an area that is used as a study. It has a closet on the south wall through which one enters a bathroom. Thus the bathroom is on the west side of the house between the north and south rooms on that side. The ceiling is approximately 8½ ft. high. I believe it is painted gypsum board. I do not think it is a plaster ceiling, but it may be. There are no cracks in the living room ceiling and one crack in the ceiling in the study. The interior of the house is in very good condition and tastefully decorated. It is obviously well taken care of. There is no pathway for air from the closet in the room in the northwest corner of the house to the attic. The bathroom ceiling is similarly in excellent condition and painted over. It appears to be plaster. One leaves the bathroom to enter a kitchen area with what could have been a dining area on the west side, but is a store room area. The kitchen has a set of laid-in ceiling tiles. I will remove one to see what is above it and we'll do this after completing a description of the house. There is a door from the kitchen dining room area to a small room on the back of the house and a door leading from that room to the porch area. This small room is used as laundry room with a washer and dryer. The plaster ceiling here is covered with paint and is in good condition. The dining room area is in the southeast corner of the house. It also has a door exiting to the porch in the rear of the house. The ceiling is in good condition with one minor stain of approximately 8 by 10 inches in dimension and two small cracks in the paint. There is a light fixture affixed to the center of the ceiling.

Proceeding up the stairs, directly above the stairs and on the south side is the bathroom. This has a sloping roof ceiling. There is heavy-duty plastic covering that sloping ceiling with batting between the roof joists above the plastic. Turning left off the small hallway is the master bedroom. This has a heavily painted plaster ceiling

with some patched cracks discernable under the paint. The insulation I'm here to observe is below the floor of this second floor. This area is completely carpeted including a walk-in closet off the north side of the bedroom and a small room in the rear of the house that one enters from an archway off the bedroom. This has a table and ironing board. A sewing machine is on the table. The small room is paneled. The west side of the second floor is the children's bedroom with a bed on the rear. This is completely covered with carpet. There is a closet. On the north side there is a doorway which enters into the unfinished portion of the second floor. The joists below the roof have fibrous glass batting completely covering the area. This covers the space between the joists. The joists on the floor for all but a small area on the east side of the attic is covered with wood. The area not covered has fibrous glass batting laying over partial floorboards and the laid-in insulation. The upper part of the insulation is mineral wool and underneath the mineral wool is vermiculite. Looking at the floor and the insulation one can see the gray mineral wool insulation and the occasional flecks of the vermiculite. There are cartons of material, a suitcase, an old bed, an old door, among other things stored in this area. The children's room floor is carpeted and the ceiling is plastered. The ceiling is just below the roof of the house.

The basement is entered via the door on the north side of the kitchen. I am now proceeding into the basement. It has a mildew smell. It has a concrete foundation and it is a layered foundation; apparently constructed before mixers were used for the concrete. One sees the rock and non-rock stratification. I'm looking up at the floor joists under the first floor. I do not see any insulation there. The basement is used for storage of materials as well as to house the water heater and the oil furnace. There is an oil storage tank in the southeast corner of the basement. In the southwest corner of the basement there is asbestos thermal system insulation on the hot water pipe just below the ceiling. It has bare ends and cloth cover. There is also asbestos thermal system insulation on return heating ducts to the furnace. It is in good condition and will be photographed.

I'm on the second floor again. The ducts supplying air are on the floor to the children's bedroom with a grill approximately 12 by 8 inches. The supply grill in the bathroom is approximately 6 inches off the floor and in the wall. In the master bedroom there is a floor supply grill perhaps 8 inches by 15 inches. On the floor of the sewing room adjoining the bedroom is another grill on the lower part of the wall in the master bedroom. These grills are the ends of ducts that come up through the floor. I do not believe they are a source of any insulation in the floor to the air in the house.

I have removed one of the 4 ft. by 2 ft. ceiling tiles that are laid-in as the kitchen ceiling. There is no visible insulation above this ceiling. This ceiling has replaced the earlier ceiling in the house. There is coverage of the second floor joists

for the vast majority of that upper ceiling area as the photographs will show. Thus there is no air contact of the above ceiling space with the air that could provide any pathway from insulation to below the laid-in ceiling occupants of the first floor.

In summary this is a well maintained home with vermiculite insulation on the floorboards below a finished second floor. There is mineral wool insulation above the vermiculite. My estimate is that there's about 2 inches of vermiculite covered by perhaps 2 to 3 inches of mineral wool. There are floorboards over the vast majority, i.e., approximately 75% of the attic. The area where it was not covered has batts of fibrous glass covering the insulation in the space between the rafters. There is no connection of the attic to the lower floor. A laid-in ceiling tile in the kitchen which might have exposed air above the laid-in ceiling tile to insulation in the floorboards below the second floor do not have air in contact with the insulation. In the basement of the home there is thermal system insulation of asbestos containing material. It is either covered with fabric or of the non-friable transite type of duct. There is no connection between the basement and the attic yielding an air route for insulation from attic to basement.

Thus, even if the vermiculite insulation in the attic proves to be a regulated ACM (graded 1% by weight asbestos) I do not see an air route connection for exposure of occupants of this home.

A renovation has already been performed. A future renovation is to be performed that might involve a regulated insulation. Operations and maintenance procedures developed in the 1980s and 1990s would fully protect any workmen. Therefore I do not see a significant risk to occupants of this building or potential future remodelers in the form of asbestos fibers in the air if the vermiculite attic insulation proves to be a regulated ACM.

1404 South Lakeside (Hatch house)

It is 3:00 p.m. This a lakeside house at Liberty Lake. Apparently, all the alleged ACM attic insulation has been removed. Therefore this will be an inspection of the house in the absence of the attic insulation. This is a lakeside home with direct access from the rear of the home to a porch and below the porch to the beach and a pier on the lake. The house is located on the east side of the lake and is situated facing northwest. It is a two-story house. One enters the upper story from the hillside and can descend a flight of stairs interior to the house to the lower level. The attic is accessed from a closet in the master bedroom of the house.

I will now walk through the layout of the house entering the entry door. On the right side of the entry there is a laundry area and then an archway entering the kitchen so the kitchen is in the northeast part of the house. It faces the north and the hillside from which we entered. There is an archway entry to the living room which is in the northwest corner of the house and there is a porch outside this living room going down to the decking on the lower level. The ceilings in the house are approximately 8 ft. high. They are a trowled-on plaster type ceiling. In the kitchen there are two skylights. The ceilings are in excellent condition with no sign of cracks or open holes. The southwest corner of the house is the master bedroom with the same type of ceiling. There is a closet which has a ceiling in its integrity and no outlet to the attic and the closet I mentioned with the access to the attic. That access is about 4 ft. by 2½ ft. There is a bathroom off the master bedroom. It appears to have a sheet rock ceiling. There is some renovation going on in this bathroom. There is also a shower with a ceiling in its integrity. Thus no air access to the attic.

I am now descending the stairs to the lower level of the house and enter what is an office space in the southwest corner of the house. This has a simulated ceiling tile or a ceiling tile pasted onto ceiling. There is a bathroom storage area off of this office and that is on the east of the office. That constitutes the space on the lower level. On that side of the house there is an access through a door that goes under the stairs to a storage area and this is the northeast corner of the lower level. It is used for storage. It contains the circuit breaker box for the house. It has a plywood ceiling in its integrity. There is yet another area entered through a door on the east of this storeroom that leads to the bare hillside and a water heater.

I am now in the attic. I climbed a ladder to get up here. I can stand. The central peak of the roof, which is from east to west, is about 9 ft. high. The material up here has apparently been removed. There is nothing between the floor joists. There is no insulation on the rafters beneath the roof. This is an unfinished attic. There is attic ventilation at the peak of the roof on the south side of the house. It is alleged that vermiculite insulation was between these floor joists. I see no sign of it now. There is some electrical wiring in the attic and there is a riser on the south side. There does not seem to be any connection between the roof and the floor beneath it. There is masonite or plywood between the joists that I am looking at. I don't think this is new construction, I think this was here and the insulation was removed from these locations.

I can opine on the probability of exposure to those occupants of the house below the attic if there was an ACM regulated material laid-in between these joists. The probability of exposure would be minimal, if any, and would occur only if the individuals were in the attic. The renovations going on beneath the attic do not seem

to be intruding into the ceiling of the second level which is beneath the attic. Therefore with the current nature of remodeling I don't see opportunity for exposure. However, the material was abated allegedly because of concerns for the health of occupants of the home. I think there would have been no significant impact on the health of such occupants based on what I am observing, even with a regulated ACM. It remains to be determined if the vermiculite attic insulation is a regulated ACM.

In my description of the home I neglected the room on the left side of the entry, which looks to be a small family room. Same plaster ceilings and between it and the master bedroom is another bathroom. This is more of a powder room. It does not have a shower. All the ceilings are the trowled-on plaster type ceiling I noted earlier, except for the entry hallway and the entry way which seems to be a painted gypsum board.

The heating system of this house is baseboard electric heating. There is no ducting of air or forced air supply system. The exterior of the house is wood and I believe it is redwood. In summary, the alleged vermiculite insulation was allegedly in the attic of this home between the floor joists. It has been removed and I am not certain of the extent of coverage of the floor joists with the insulation. The removal contract should enable this to be determined. The attic is a full walk-in. There is integrity of the ceilings of the floor below the attic with no air pathway for the alleged insulation to connect with the air of the second floor where there may be occupants. There is no renovation of the attic in progress. Similarly, the lower floor ceilings are all in their integrity and there is no air communication to the attic. The heating system is electric and there is no forced air in any part of the house. Therefore it is difficult for me to see any significant risk to the health of occupants from any attic insulation even if it was a regulated ACM. It remains to be determined if the vermiculite insulation used was a regulated ACM. This will end my dictation for the three homes on the 16th of August, 2000.